REMARKS

1. Drawings

Applicants note that the basis for objection to the drawings is that Figures 4A-6D do not have uniform and clear lines and labeling. Accordingly, formal drawings for Figures 1A-6D have been prepared and are submitted concurrently herewith.

2. Specification

Amendments to lines 13-14 on page 5 have been presented to more accurately introduce Figures 4A and 4B of the application. Amendments to the first paragraph of the SUMMARY OF THE INVENTION beginning on page 2, line 26 and continuing to page 3 and the ABSTRACT on page 24 have been presented to incorporate handwritten edits made by the inventors when the application was executed. No new matter has been added.

3. Claim Rejections

Claims 1-50 have been examined. Claims 1-3, 6-8, 11-16, 19-24, 27-29, 32, 35, 38-41, and 44-48 stand rejected under 35 U.S.C. §102(e) as being anticipated by Weverka et al (U.S. Patent No. 6,501,877). Claims 4-5, 9-10, 17-18, 25-26, 30-31, 33-34, 36-37, 42-43, and 49-50 have been identified as containing allowable subject matter except for their dependence on rejected base claims.

All of the rejections are based in part on the assertion that Weverka et al discloses that "dispersion in the focal distance of the first focusing element for different angularly separated beams compensates for field curvature aberration." (Office Action, ¶6, emphasis

added). The Office Action supports this assertion by referencing Figures 1-3 and Columns 5-7 of Weverka et al. (*Id.*) This basis of rejection is respectfully traversed.

In order for a reference to anticipate a claim under 35 U.S.C. §102, the reference must teach every element of the claim. MPEP 2131. Weverka et al teaches a design that effectively compensates for <u>dispersion</u> (col. 6, lines 26-29). This is fundamentally different than the disclosures of the claimed invention that teach the <u>use of</u> dispersion to compensate for <u>field curvature</u>. For example, claim 1 recites a <u>relative disposition</u> of a dispersive element, a first focusing element, and a substantially planar array of optical elements "such that dispersion in the focal distance of the first focusing element for different angularly separated beams <u>compensates for field curvature aberration</u> caused by the first focusing element." This claimed relative disposition is not disclosed in Weverka et al. Applicants note that while Figures 1-3 of Weverka et al appear similar to Figures 1-3 of the application, the claimed disposition and its effect on field curvature aberration is illustrated in Figures 4A-6D of the application, which do not appear in Weverka et al. Thus, Weverka et al does not teach every element of claim 1, and independent claim 1 is therefore believed to be allowable for at least these reasons. For at least similar reasons, independent claims 19, 35, and 40, which also recite a similar disposition, are also believed to be allowable.

The allowability of all the dependent claims is believed to ensue from the allowability of independent claims 1, 19, 35, and 40, at least for the reasons stated above.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

Patrick M. Boucher
Reg. No. 44,037

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, 8th Floor
San Francisco, California 94111-3834
Tel: 303-571-4000
Fax: 415-576-0300
PMB:pmb

APPENDIX: LISTING OF CLAIMS

1. (Original) An optical arrangement for receiving, at an input port, a light beam having a plurality of spectral bands and directing subsets of the spectral bands along optical paths to respective optical elements configured as a substantially planar array, the optical arrangement comprising:

a dispersive element configured to diffract the light beam, after it has been collimated, into a plurality of angularly separated beams corresponding to the plurality of spectral bands; and

a first focusing element disposed with respect to the dispersive element and with respect to the substantially planar array of optical elements such that dispersion in the focal distance of the first focusing element for different angularly separated beams compensates for field curvature aberration caused by the first focusing element.

2. (Original) The optical arrangement recited in claim 1 wherein the dispersive element is a reflective diffraction grating and wherein the first focusing element is further disposed with respect to the reflective diffraction grating to collimate the light beam before the light beam encounters the reflective diffraction grating.

3. (Original) The optical arrangement recited in claim 2 wherein the input port is substantially coplanar with the array of optical elements.

4. (Original) The optical arrangement recited in claim 3 wherein the field curvature aberration is a positive field curvature aberration and the input port is positioned proximate the optical element corresponding to the shortest-wavelength spectral band, with

optical elements corresponding to progressively longer-wavelength spectral bands positioned progressively farther from the input port.

5. (Original) The optical arrangement recited in claim 3 wherein the field curvature aberration is a negative field curvature aberration and the input port is positioned proximate the optical element corresponding to the longest-wavelength spectral band, with optical elements corresponding to progressively shorter-wavelength spectral bands positioned progressively farther from the input port.

6. (Original) The optical arrangement recited in claim 2 wherein the first focusing element is a lens disposed between the input port and the reflective diffraction grating.

7. (Original) The optical arrangement recited in claim 2 wherein the first focusing element is a curved reflector disposed to intercept light from the input port.

8. (Original) The optical arrangement recited in claim 1 wherein the dispersive element is a transmissive diffraction grating, the optical arrangement further comprising a second focusing element disposed with respect to the transmissive diffraction grating to collimate the light beam before the light beam encounters the transmissive diffraction grating.

9. (Original) The optical arrangement recited in claim 8,

wherein the field curvature aberration is a positive field curvature aberration,

wherein the first and second focusing elements have a common symmetry axis that is substantially orthogonal to the array of optical elements,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from the symmetry axis by an amount substantially equal to a displacement

from the symmetry axis by the optical element corresponding to the shortest-wavelength spectral band, and

wherein optical elements corresponding to progressively longer-wavelength spectral bands are progressively farther from the optical element corresponding to the shortest-wavelength spectral band.

10. (Original) The optical arrangement recited in claim 8,

wherein the field curvature aberration is a negative field curvature aberration,

wherein the first and second focusing elements have a common symmetry axis that is substantially orthogonal to the array of optical elements,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from the symmetry axis by an amount substantially equal to a displacement from the symmetry axis by the optical element corresponding to the longest-wavelength spectral band, and

wherein optical elements corresponding to progressively shorter-wavelength spectral bands are progressively farther from the optical element corresponding to the longest-wavelength spectral band.

11. (Original) The optical arrangement recited in claim 8 wherein the first focusing element is a lens disposed between the transmissive diffraction grating and the array of optical elements and the second focusing element is a lens disposed between the input port and the transmissive diffraction grating.

12. (Original) The optical arrangement recited in claim 1 wherein the dispersive element is a prism, the optical arrangement further comprising a second focusing

PATENT

element disposed with respect to the prism to collimate the light beam before the light beam encounters the prism.

13. (Original) The optical arrangement recited in claim 1 wherein the dispersive element is a grism.

14. (Original) The optical arrangement recited in claim 1 wherein the array of optical elements comprises an array of routing elements.

15. (Original) The optical arrangement recited in claim 14 wherein each such routing element is dynamically configurable to direct a given angularly separated beam to different ones of a plurality of output ports depending on its state.

16. (Original) The optical arrangement recited in claim 1 wherein the array of optical elements comprises an array of detector elements.

17. (Original) The optical arrangement recited in claim 1 wherein the dispersive element is angularly positioned with respect to the first focusing element to minimize the field curvature aberration.

18. (Original) The optical arrangement recited in claim 1 wherein the first focusing element is configured to have a specific field curvature aberration based on an angular position of the dispersive element with respect to the first focusing element.

19. (Original) A wavelength router for receiving, at an input port, light having a plurality of spectral bands and directing subsets of the spectral bands to respective ones of a plurality of output ports, the wavelength router comprising:

a routing mechanism having a substantially planar array of dynamically configurable routing elements, each of which is structured to direct a given spectral band to

different output ports, depending on a state of such dynamically configurable routing element; and

a free-space optical train disposed between the input port and the output ports providing optical paths for routing the spectral bands, the optical train including:

a dispersive element disposed to intercept light traveling from the input port and to diffract it into a plurality of angularly separated beams corresponding to the plurality of spectral bands, the optical train being configured so that light encounters the dispersive element before reaching any of the output ports; and

a first focusing element disposed with respect to the dispersive element and with respect to the substantially planar array of dynamically configurable routing elements such that dispersion in the focal distance of the first focusing element for different angularly separated beams compensates for field curvature aberration caused by the first focusing element.

20. (Original) The wavelength router recited in claim 19 wherein the input port is located at the end of an input fiber.

21. (Original) The wavelength router recited in claim 19 wherein the output ports are located at respective ends of a plurality of output fibers.

22. (Original) The wavelength router recited in claim 19 wherein the routing mechanism includes a plurality of reflecting elements, each associated with a respective one of the spectral bands.

23. (Original) The wavelength router recited in claim 19 wherein the dispersive element is a reflective diffraction grating and wherein the first focusing element is

further disposed with respect to the reflective diffraction grating to collimate light from the input port before encountering the reflective diffraction grating.

24. (Original) The wavelength router recited in claim 23 wherein the input port is substantially coplanar with the array of dynamically configurable routing elements.

25. (Original) The wavelength router recited in claim 24 wherein the field curvature aberration is a positive field curvature aberration and the input port is positioned proximate the routing element corresponding to the shortest-wavelength spectral band, with routing elements corresponding to progressively longer-wavelength spectral bands positioned progressively farther from the input port.

26. (Original) The wavelength router recited in claim 24 wherein the field curvature aberration is a negative field curvature aberration and the input port is positioned proximate the routing element corresponding to the longest-wavelength spectral band, with routing elements corresponding to progressively shorter-wavelength spectral bands positioned progressively farther from the input port.

27. (Original) The wavelength router recited in claim 23 wherein the first focusing element is a lens disposed between the input port and the reflective diffraction grating.

28. (Original) The wavelength router recited in claim 23 wherein the first focusing element is a curved reflector disposed to intercept light from the input port.

29. (Original) The wavelength router recited in claim 19 wherein the dispersive element is a transmissive diffraction grating, the free-space optical train further comprising a second focusing element disposed with respect to the transmissive diffraction

grating to collimate light from the input port before encountering the transmissive diffraction grating.

30. (Original) The wavelength router recited in claim 29,

wherein the field curvature aberration is a positive field curvature aberration,

wherein the first and second focusing elements have a common symmetry axis that is substantially orthogonal to the array of dynamically configurable routing elements,

wherein the input port is positioned within a plane parallel to the array of dynamically configurable routing elements, displaced from the symmetry axis by an amount substantially equal to a displacement from the symmetry axis by routing element corresponding to the shortest-wavelength spectral band, and

wherein routing elements corresponding to progressively longer-wavelength spectral bands are progressively farther from the routing element corresponding to the shortest-wavelength spectral band.

31. (Original) The wavelength router recited in claim 29,

wherein the field curvature aberration is a negative field curvature aberration,

wherein the first and second focusing elements have a common symmetry axis that is substantially orthogonal to the array of dynamically configurable routing elements,

wherein the input port is positioned within a plane parallel to the array of dynamically configurable routing elements, displaced from the symmetry axis by an amount substantially equal to a displacement from the symmetry axis by routing element corresponding to the longest-wavelength spectral band, and

wherein routing elements corresponding to progressively shorter-wavelength spectral bands are progressively farther from the routing element corresponding to the longest-wavelength spectral band.

32. (Original) The wavelength router recited in claim 29 wherein the first focusing element is a lens disposed between the transmissive diffraction grating and the array of dynamically configurable routing elements and the second focusing element is a lens disposed between the input port and the transmissive diffraction grating.

33. (Original) The optical arrangement recited in claim 19 wherein the dispersive element is angularly positioned with respect to the first focusing element to minimize the field curvature aberration.

34. (Original) The optical arrangement recited in claim 19 wherein the first focusing element is configured to have a specific field curvature aberration based on an angular position of the dispersive element with respect to the first focusing element.

35. (Original) An optical arrangement for receiving, at an input port, a light beam having a plurality of spectral bands and directing subsets of the spectral bands along optical paths to respective optical elements configured as a substantially planar array, the optical arrangement comprising:

means for collimating the light beam;

means for diffracting the collimated light beam into a plurality of angularly separated beams corresponding to the plurality of spectral bands; and

means for focusing the angularly separated beams onto respective ones of the optical elements, such means for focusing disposed with respect to the means for diffracting such

that dispersion in the focal distance of such means for focusing compensates for field curvature aberration caused by such means for focusing.

36. (Original) The optical arrangement recited in claim 35,

wherein the field curvature aberration is a positive field curvature aberration,

wherein the means for focusing has a symmetry axis that is substantially orthogonal to the array of optical elements,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from the symmetry axis by an amount approximately equal to a displacement from the symmetry axis by the optical element corresponding to the shortest-wavelength spectral band, and

wherein optical elements corresponding to progressively longer-wavelength spectral bands are progressively farther from the optical element corresponding to the shortest-wavelength spectral band.

37. (Original) The optical arrangement recited in claim 35,

wherein the field curvature aberration is a negative field curvature aberration,

wherein the means for focusing has a symmetry axis that is substantially orthogonal to the array of optical elements,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from the symmetry axis by an amount approximately equal to a displacement from the symmetry axis by the optical element corresponding to the longest-wavelength spectral band, and

wherein optical elements corresponding to progressively shorter-wavelength spectral bands are progressively farther from the optical element corresponding to the longest-wavelength spectral band.

38. (Original) The optical arrangement recited in claim 36 wherein the input port is substantially coplanar with the array of optical elements.

39. (Original) The optical arrangement recited in claim 35 wherein the array of optical elements comprises an array of dynamically configurable routing elements, each of which may direct a given angularly separated beam to different output ports depending on its state.

40. (Original) A method for directing spectral bands of a light beam having a plurality of such spectral bands along optical paths to respective optical elements configured as a substantially planar array, the method comprising:

receiving the light beam at an input port;

propagating the light beam from the input port such that it intercepted by a dispersive element;

separating the light beam with the dispersive element into a plurality of angularly separated beams corresponding to the plurality of spectral bands; and

focusing a subset of the plurality of angularly separated beams onto respective ones of the optical elements with a first focusing element disposed with respect to the dispersive element and with respect to the substantially planar array of optical elements such that dispersion in the focal distance for different spectral bands compensates for field curvature aberration.

41. (Original) The method recited in claim 40 further comprising collimating the light beam before it is intercepted by the dispersive element.

42 . (Original) The method recited in claim 41,

wherein the field curvature aberration is a positive field curvature aberration,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from a symmetry axis orthogonal to the array of optical elements by an amount approximately equal to a displacement from the symmetry axis by the optical element corresponding to the shortest-wavelength spectral band, and

wherein optical elements corresponding to progressively longer-wavelength spectral bands are progressively farther from the optical element corresponding to the shortest-wavelength spectral band.

43. (Original) The method recited in claim 41,

wherein the field curvature aberration is a negative field curvature aberration,

wherein the input port is positioned within a plane parallel to the array of optical elements, displaced from a symmetry axis orthogonal to the array of optical elements by an amount approximately equal to a displacement from the symmetry axis by the optical element corresponding to the longest-wavelength spectral band, and

wherein optical elements corresponding to progressively shorter-wavelength spectral bands are progressively farther from the optical element corresponding to the longest-wavelength spectral band.

44. (Original) The method recited in claim 42 wherein the input port is substantially coplanar with the array of optical elements.

45. (Original) The method recited in claim 44 wherein separating the light beam comprises simultaneously diffracting and reflecting the light beam.

46. (Original) The method recited in claim 42 wherein separating the light beam comprises simultaneously diffracting and transmitting the light beam.

47. (Original) The method recited in claim 41 further comprising dynamically routing each of the focused subset of angularly separated beams to different output ports depending on a state of the corresponding optical element.

48. (Original) The method recited in claim 41 further comprising detecting each of the focused subset of angularly separated beams.

49. (Original) The method recited in claim 40 further comprising angularly positioning the dispersive element with respect to the first focusing element to minimize the field curvature aberration.

50. (Original) The method recited in claim 40 further comprising designing the first focusing element to have a specific field curvature aberration based on an angular position of the dispersive element with respect to the first focusing element.